

What is claimed is:

1. A multi-modal forced vortex device, comprising:
 - a top plate comprising adjustable fluid passages;
 - a side wall coupled to the top plate to create a partially enclosed volume;
 - a plurality of blades adapted to rotate within the partially enclosed volume;
 - pitch adjustment means for adjusting the pitch of at least one of the blades; and
 - a rotating means for rotating the plurality of blades.
2. The device of claim 1, wherein the top plate comprises a surface having a substantially circular cross-section.
3. The device of claim 1, wherein the adjustable fluid passages comprise an iris.
4. The device of claim 1, wherein the adjustable fluid passages comprise:
 - a first plurality of fixed sized openings in the top plate;
 - a lower plate having a second plurality of fixed sized openings, the lower plate positioned between the top plate and the blades; and
 - an adjustment means for moving the lower plate relative to the upper plate whereby the second plurality of fixed sized openings can be aligned with the first plurality of fixed sized openings.

5. The device of claim 4, wherein the adjustment means is further adapted to move the lower plate relative to the upper plate whereby the second plurality of fixed sized openings can be partially aligned with the first plurality of fixed sized openings.
6. The device of claim 4, wherein the first plurality of fixed sized openings comprise holes having a substantially circular cross-section.
7. The device of claim 4, wherein the first plurality of fixed sized openings comprise holes having a substantially non-circular cross-section.
8. The device of claim 4, wherein the first plurality of fixed sized openings comprise a first portion of fixed sized openings having a first cross-sectional shape and a second portion of fixed sized openings having a second cross-sectional shape.
9. The device of claim 4, wherein the first plurality of fixed sized openings and the second plurality of fixed sized openings have substantially the same cross-sectional shape.
10. The device of claim 4, wherein the adjustment means comprises:
gear teeth on at least a portion of an outer edge of the lower plate;
a shaft having a first end, wherein the first end has gear teeth operatively coupled to the gear teeth on the outer edge of the lower plate; and
a power source adapted to rotate the shaft.

11. The device of claim 1, wherein the side wall is coupled at an approximately ninety degree (90°) angle relative to a top surface of the top plate.
12. The device of claim 1, wherein the partially enclosed volume comprises a substantially circular cross-section.
13. The device of claim 1, wherein the blades are adapted to sweep out substantially all of the partially enclosed volume when in a first position.
14. The device of claim 1, wherein the pitch adjustment means is adapted to adjust the pitch of the at least one blade through approximately 360 degrees.
15. The device of claim 1, wherein the pitch adjustment means is adapted to adjust the pitch of the at least one blade through between approximately plus and minus ninety degrees (90°) relative to a vertical position.
16. The device of claim 1, wherein each of the plurality of blades is coupled to a separate pitch adjustment means.
17. The device of claim 16, wherein each of the plurality of pitch adjustment means adjusts the pitch of a blade independently of the action of any other one of the pitch adjustment means.
18. The device of claim 1, wherein the blades comprise an aerofoil cross-section.

19. The device of claim 1, wherein the blades comprise a rectangular shape.
20. The device of claim 1, further comprising a skirt coupled to the side wall and extending below the side wall.
21. The device of claim 1, further comprising a porous mesh coupled to a side of the side wall opposite the top plate and extending across the device in a plane substantially parallel to the top plate.
22. The device of claim 1, wherein the adjustable fluid passages comprises a plurality of adjustable size openings in the top plate.
23. The device of claim 1, wherein the rotating means is adapted to adjust the speed of rotation of the plurality of blades.
24. The device of claim 1, wherein the rotating means comprises an electric motor.
25. The device of claim 1, wherein the rotating means is selected from the group consisting of an electric motor, an internal combustion engine, a fuel cell and a gas turbine.
26. The device of claim 1, wherein at least one of the top plate and side wall comprise a metal.

27. The device of claim 1, wherein at least one of the top plate and side wall comprise a composite.

28. The device of claim 1, wherein at least one of the top plate and side wall comprise a plastic.

29. A vehicle having coupled thereto a device comprising:
a top plate comprising adjustable fluid passages;
a side wall coupled to the top plate to create a partially enclosed volume;
a plurality of blades adapted to rotate within the partially enclosed volume;
pitch adjustment means for adjusting the pitch of at least one of the blades; and
a rotating means for rotating the plurality of blades.

30. The vehicle of claim 29, wherein the vehicle comprises an automobile.

31. The vehicle of claim 29, wherein the vehicle comprises a submersible vehicle.

32. An apparatus comprising,
- a first top plate comprising adjustable fluid passages;
- a first side wall coupled to the first top plate to create a first partially enclosed volume;
- a first plurality of blades adapted to rotate within the first partially enclosed volume;
- a first pitch adjustment means for adjusting the pitch of at least one of the first plurality of blades;
- a first rotating means for rotating the first plurality of blades;
- a second top plate comprising a second set of adjustable fluid passages;
- a second side wall coupled to the second top plate to create a second partially enclosed volume;
- a second plurality of blades adapted to rotate within the second partially enclosed volume;
- a second pitch adjustment means for adjusting the pitch of at least one of the second plurality of blades; and
- a second rotating means for rotating the second plurality of blades.

33. The apparatus of claim 32, wherein the first plate and second plate comprise the same plate.

34. The apparatus of claim 32, wherein the first rotating means and the second rotating means comprises a single motor.